

Claims: I claim:

1. An imaging-based distance measurement and three-dimensional profiling system comprising:
 - a) source of illumination,
 - b) mask of two-dimensional pattern through which said illumination is projected onto the objects,
 - c) means for acquiring images of said objects from predetermined and different view points, and
 - d) computer program for identifying each area in said two-dimensional pattern in said acquired images and calculating the distance of said each area using the identified coordinates of said each area in said acquired images and the positional relationship of said predetermined and different view points.
2. The imaging-based distance measurement and three-dimensional profiling system of Claim 1 wherein said source of illumination is of any light wavelength or any combination of different wavelengths, of steady, pulsed, or flash operation.
3. The imaging-based distance measurement and three-dimensional profiling system of Claim 1 wherein said source of illumination can use an optical filter or a set of optical filters for selecting a specific range of light wavelength.
4. The imaging-based distance measurement and three-dimensional profiling system of Claim 1 wherein said mask of two-dimensional pattern is of a glass material, a plastic material, a film material, or any combination of these materials.
5. The imaging-based distance measurement and three-dimensional profiling system of Claim 1 wherein said mask of two-dimensional pattern can be a composite of multiple mask layers to combine the patterns in each mask layer.

6. The imaging-based distance measurement and three-dimensional profiling system of Claim 1 wherein said two-dimensional pattern is of black and white, transparent and opaque, gray-scale, or any combination of different colors.
7. The imaging-based distance measurement and three-dimensional profiling system of Claim 1 wherein said means for acquiring images of said objects from predetermined and different view points can use two cameras, multitude of cameras, or a single camera.
8. The imaging-based distance measurement and three-dimensional profiling system of Claim 1 wherein said means for acquiring images of said objects from predetermined and different view points includes digital cameras, CCD type cameras, video cameras or motion picture cameras.
9. The imaging-based distance measurement and three-dimensional profiling system of Claim 1 wherein said means for acquiring images of said objects from predetermined and different view points can use an optical filter or a set of optical filters for selecting a specific range of light wavelength.
10. The imaging-based distance measurement and three-dimensional profiling system of Claim 1 wherein said means for acquiring images of said objects from predetermined and different view points includes computer processing of images whereby said processed images have enhanced pattern contrasts.
11. The imaging-based distance measurement and three-dimensional profiling system of Claim 10 wherein said computer processing of images includes pixel-to-pixel subtraction between two images acquired from a same view point, where one image is acquired when there is no projection and the other image is acquired when said illumination is projected through said mask of two-dimensional pattern.

12. The imaging-based distance measurement and three-dimensional profiling system of Claim 10 wherein said computer processing of images includes pixel-to-pixel subtraction between two images acquired from a same view point, where one image is acquired when the illumination is projected with no mask and the other image acquired when the illumination is projected through said mask of two-dimensional pattern.
13. The imaging-based distance measurement and three-dimensional profiling system of Claim 10 wherein said computer processing of images includes processings of plurality of images acquired from a same view point, where said images are acquired by using plurality of masks of different two-dimensional patterns.
14. The imaging-based distance measurement and three-dimensional profiling system of Claim 1 wherein said computer program for identifying each area in said two-dimensional pattern in said acquired images and calculating the distance of said each area can include the functionality of collecting the distance information of each pixel for all pixels in certain areas of the image or for all pixels in the image, whereby said computer program can obtain the three-dimensional profiles of objects in the image.